SUBSTITUTE SPECIFICATION

ACTUATOR HAVING AN ELECTRIC ACTUATING MOTOR AND CONTROLLABLE FRICTION CLUTCH HAVING SUCH AN ACTUATOR

BACKGROUND OF THE INVENTION

[0001] The invention relates to an actuator comprising an electric actuating motor, a transmission mechanism and an actuating element, it being possible for the actuating element to be brought into a specific position by the actuating motor being driven and also to be held in this position, and the actuating motor being a DC motor which comprises a first part with a number of permanent magnets distributed over the circumference and a second part which has pole teeth having windings, which are fed with commutated current, and it being possible for one of the two parts to be rotated in relation to the other.

[0002] Actuators are used for automation purposes in a wide variety of systems and apparatuses, in particular also for operating gear mechanisms, for actuating controllable clutches, for example in motor vehicles, and also for window winders, seat adjustment devices or the like in motor vehicles. In all of these applications it is necessary to hold the switched position/adjustment even when the switching or adjustment has been executed.

[0003] In this regard there are in principle three possibilities: firstly: the transmission mechanism is self-locking, for example a worm gear having a high transmission ratio. However, this considerably impairs the efficiency and requires a larger, more powerful motor. Secondly: a current, a holding current, continues to be applied to the motor, even in the respective position. Although the current is lower, it does result in an increased thermal load on the motor over a relatively long period of time and requires energy. In addition, it needs to be set very precisely. Thirdly: an additional brake,